

RECEIVED  
 CENTRAL FAX CENTER  
 JUL 05 2007  
 Attorney Docket No.: N1085-00168  
 [TSMC 2003-0219]

009/013

Appl. No. 10/743,985  
 Amdt. dated 07/05/2007  
 Response to Office Action of 04/05/2007

**REMARKS/ARGUMENTS**

Claims 11-19 and 36 were previously pending in the subject application. Claims 11, 12 and 14-19 were rejected in the subject Office action and claims 13 and 36 were indicated as having been withdrawn from consideration in the subject Office action..

5 Claims 11, 19 and 36 are amended in this paper. Claims 37-46 are newly added.

Applicants respectfully request reconsideration of both the election/restriction and the rejections, re-consideration of the application and allowance of each of pending claims 11- 19 and 36-46.

Briefly and in summary, Applicants provide the following which addresses both 10 the election/restriction, the claim rejections under 35 U.S.C. § 112, and the claim rejections based on the prior art.

Layer 132 in FIG. 2E is a gate oxide layer of uniform thickness and forms only a part of the **gate oxide** which consists of both the gate oxide layer (132) and implant regions (128). Support for this feature can be found throughout the originally-filed 15 specification and was in the originally-filed claims. Originally-filed claim 1 recites "forming a gate oxide on the substrate, with the gate oxide being thicker by having the oxygen or halogen ions providing gate oxide regions in the substrate." In other words, the implanted ions form a **gate oxide region** in the substrate and a uniform thickness gate oxide *layer* is formed over the substrate. Together, the gate oxide *region* and the 20 gate oxide *layer* combine to form the **gate oxide**. Independent claims 11 and 36 have been amended for clarity only, as Applicants respectfully submit that previously-pending claims (11 + 13) and 36 each recited a uniform thickness **gate oxide layer** formed over a substrate that included discrete implant regions therein and the specification supports 25 that the discrete implant regions therein form gate oxide regions in the substrate. This aspect has now been particularized in independent claims 11 and 36 and is also recited in new claim 41. Additional support for the feature that the ions of the implant region form **gate oxide regions** was also found in claim 11, for example, prior to the amendments filed on February 28, 2007.

JUL 05 2007

Appl. No. 10/743,985  
Amdt. dated 07/05/2007  
Response to Office Action of 04/05/2007

Attorney Docket No.: N1085-00168  
[TSMC 2003-0219]

Particular aspects of the Office action are addressed below.

**I. Election/Restrictions**

The Office action contends that claims 36 and 13 are directed to an invention that is independent or distinct from the invention originally claimed because "newly-added 5 claim 36 pertains to a gate oxide having the same thickness; in contrast, the originally-elected species requires thicker gate oxides." The election mandating the Examiner to withdraw claims 13 and 36 should be withdrawn, because, while the *gate oxide layer* in claims 13 and 36 is indeed recited to be of uniform thickness, the feature of the gate oxide having different thicknesses is maintained in claims 13 and 36, for reasons 10 discussed above. It is respectfully submitted that claims 13 and 36 are each directed to the elected species – a semiconductor device with different gate oxide thicknesses.

The withdrawal of claims 13 and 36 under 37 CFR 1.142(b) as being directed to a non-elected invention, is improper and should be obviated. Claims 13 and 36 should be examined on the merits and are believed to be in allowable form.

**15 II. Claim Rejections – 35 U.S.C. § 112**

Claims 11-19 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. These claim rejections are overcome for reasons set forth below. As above, claim 11 has been amended and claim 19 amended for consistency with the amendment to claim 11.

20 The specification amended herein now explicitly recites the feature of the implanted ions providing discrete implant regions. No new matter is being added, as these discrete implant regions were illustrated in the originally-filed figures and discussed in the corresponding originally-filed specification. As such, the addition of the term "discrete" merely explicitly recites that which was inherently taught in the filed application. The Office action acknowledges as much, as, in the claim rejections based 25 on the prior art, the Office action states, on page 6: "Lastly, King shows only portion of

Appl. No. 10/743,985  
Amdt. dated 07/05/2007  
Response to Office Action of 04/05/2007

Attorney Docket No.: N1085-00168  
[TSMC 2003-0219]

the substrate and gate are subject to the O ion implant and therefore, the implanted regions can be construed as 'discrete.'"

Since the term discrete is now found in the specification, the application now complies with the written description requirement of 35 U.S.C. § 112 and the claim 5 rejections thereunder, should be withdrawn.

### III. Claim Rejections – 35 U.S.C. § 103

Claims 11-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over King, et al., "Sub-5 um Multiple-Thickness Gate Oxide Technology Using Oxygen Implantation," Int. Electron Device Meeting (IEDM), San Francisco, Paper 21.1.1 (1998), 10 hereinafter "King." Applicants respectfully submit that these claim rejections are overcome based for reasons set forth above and below.

Applicants respectfully submit that, in view of the clarification provided above, the claimed invention is distinguished from King because the claimed invention provides a gate oxide layer over but not encroaching the gate oxide regions formed in the substrate 15 to provide a thicker (overall) gate oxide in certain areas.

In particular, Applicants respectfully submit that the claimed invention is distinguished from King because of the following: King teaches implanting oxygen ions then forming a gate oxide from the implanted oxygen ions. King's oxide is a thermal oxide grown from the implanted oxygen and it encroaches the original substrate surface 20 and includes a greater thickness (see FIG. 1(a), bottom) in the doped oxide regions than in the undoped regions. In contrast, the **claimed invention** teaches implanting oxygen atoms into a substrate to form a discrete oxide section within the substrate, then forming a gate oxide layer over the discrete oxide implant regions formed in the substrate (i.e. not encroaching the discrete oxide sections in the substrate). This is 25 described in the originally-filed specification, in particular in paragraph [0044] which recites "the gate oxide layer (132) covers the oxygen or fluorine implants (128), at the top surface (112).", referring to FIG. 2E. FIG. 2E also illustrates the feature that the

Appl. No. 10/743,985  
Amdt. dated 07/05/2007  
Response to Office Action of 04/05/2007

Attorney Docket No.: N1085-00168  
[TSMC 2003-0219]

gate oxide layer (132) has the same thickness over the oxygen or fluorine implants (128), as it does over the non oxygen or fluorine implanted areas.

In particular independent claims 11 and 36, each recite the features of the oxide layer being formed over and not encroaching the implant area in the substrate. Claim

5 11 recites::

oxygen ions providing discrete implant regions in a substrate of an SOI device, the discrete implant regions extending to a surface of the substrate;

10 a gate oxide layer covering but not encroaching the discrete implant regions

Claim 36 recites:

oxygen ions providing discrete implant regions in a substrate of an SOI device, the discrete implant regions extending to a surface of the substrate; and

15 a gate oxide layer formed over the surface.

Claims 11 and 36, and therefore also claims 12-19 which depend from claim 11, are distinguished from King which provides a gate oxide formed from the implanted oxygen ions, and not a gate oxide consisting of a gate oxide layer formed over the implanted oxygen ions.

20 As such, the rejection of claims 11-19 under 35 U.S.C. § 103(a) as being unpatentable over King, should be withdrawn. Independent claim 36 which should be examined on the merits for reasons stated above, is also believed distinguished from King and in allowable form, for the same reasons.

#### IV. Newly Added Claims

25 Claims 37-46 are newly added. Claims 37-40 depend from independent claim 11 or 36 which are each believed allowable for reasons set forth above. New independent claim 41 recites various combinations of features of the invention elected for prosecution and Applicants respectfully believe that claim 41 is distinguished from the

JUL 05 2007

Appl. No. 10/743,985  
Amdt. dated 07/05/2007  
Response to Office Action of 04/05/2007

Attorney Docket No.: N1085-00168  
[TSMC 2003-0219]

references of record, and in allowable form. New claims 42-46 depend from allowable claim 41.

**CONCLUSION**

Based on the foregoing, each of pending claims 11-19 and 36-46 is in allowable  
5 form and the application in condition for allowance, which action is respectfully and expeditiously requested.

The Assistant Commissioner for Patents is hereby authorized to charge any fees necessary to give effect to this filing and to credit any excess payment that may be associated with this communication, to Deposit Account 04-1679.

10

Respectfully submitted,

Dated: 05 July 2007

15

  
\_\_\_\_\_  
Mark J. Marcelli, Reg. No. 36,593  
Attorney for Applicant

20

DUANE MORRIS LLP  
101 West Broadway, Suite 900  
San Diego, CA 92101  
Telephone: (619) 744-2200  
25 Facsimile: (619) 744-2201